Single Board Technologies

Gene Parker

RADSTONE
TECHNOLOGY

Why settle for less


Performance
Survivability
Affordability
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Why VME ?

Performance

- Defined rugged platform
- Established COTS suppliers
- Provides stability for Technology Insertion
- Flexibility through PMC's
- Established multi-processing platform
- Strong legacy business
- Incremental bandwidth extensions

- Expectations of strong growth over next 5 years

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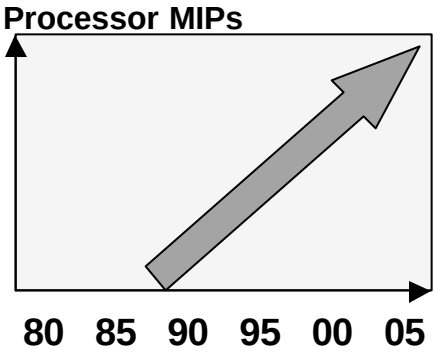
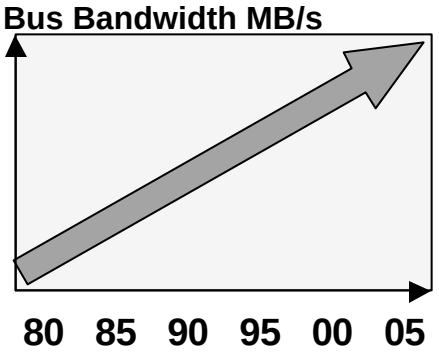
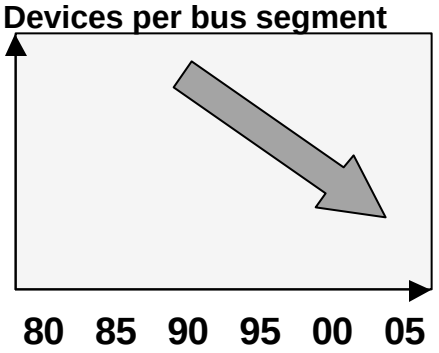
Technology Trends

Performance

- **Processing performance increasing (Moore's law)**
  - **603-100 135MIPs**
  - **750cx-550 1250MIPs**
- **Bus bandwidth increasing**
  - **VME 80MB/s**
  - **PCI 520MB/s**
- **Devices per bus segment decreasing**
  - **VME 20**
  - **PCI 10**







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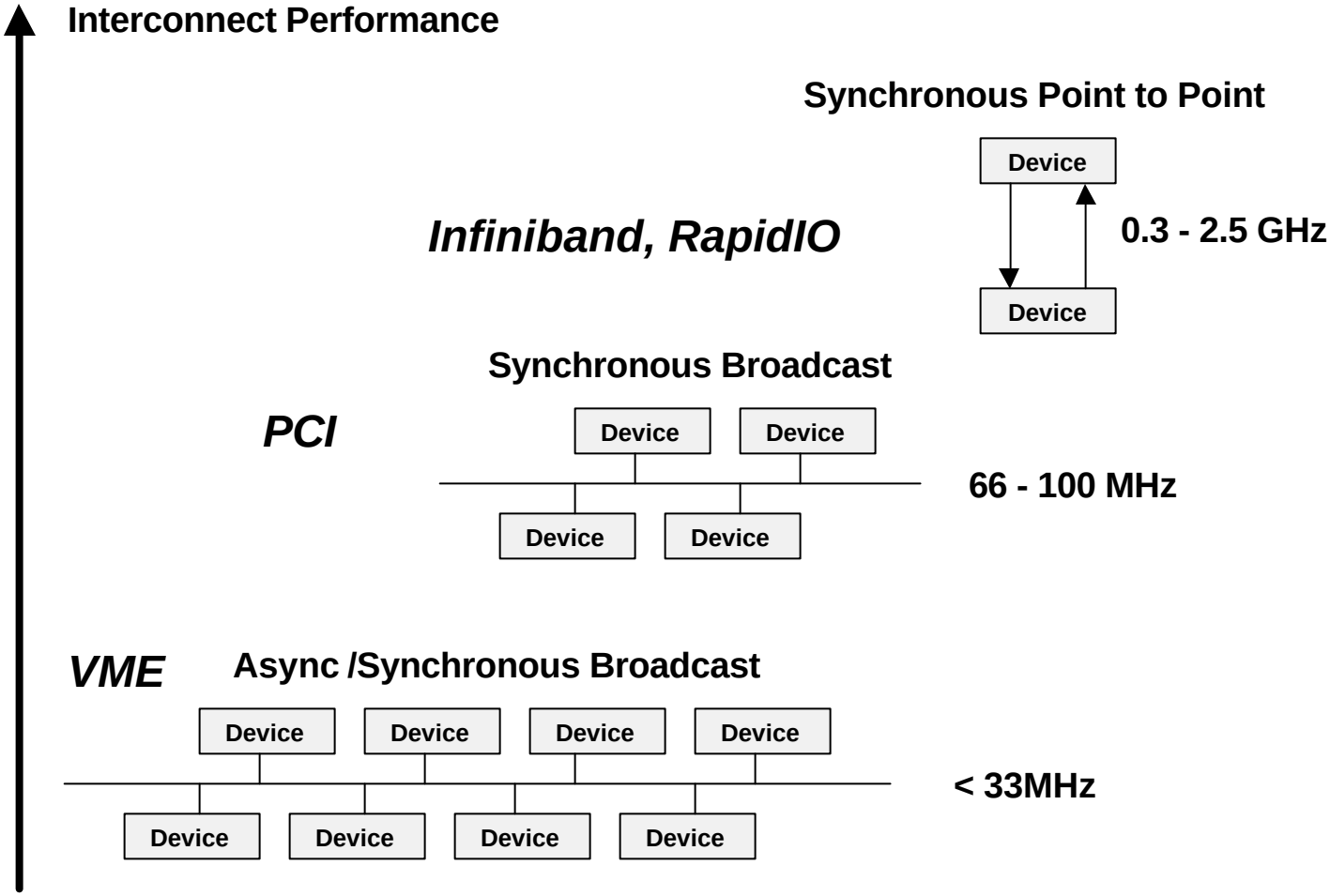
System Interconnect

Performance



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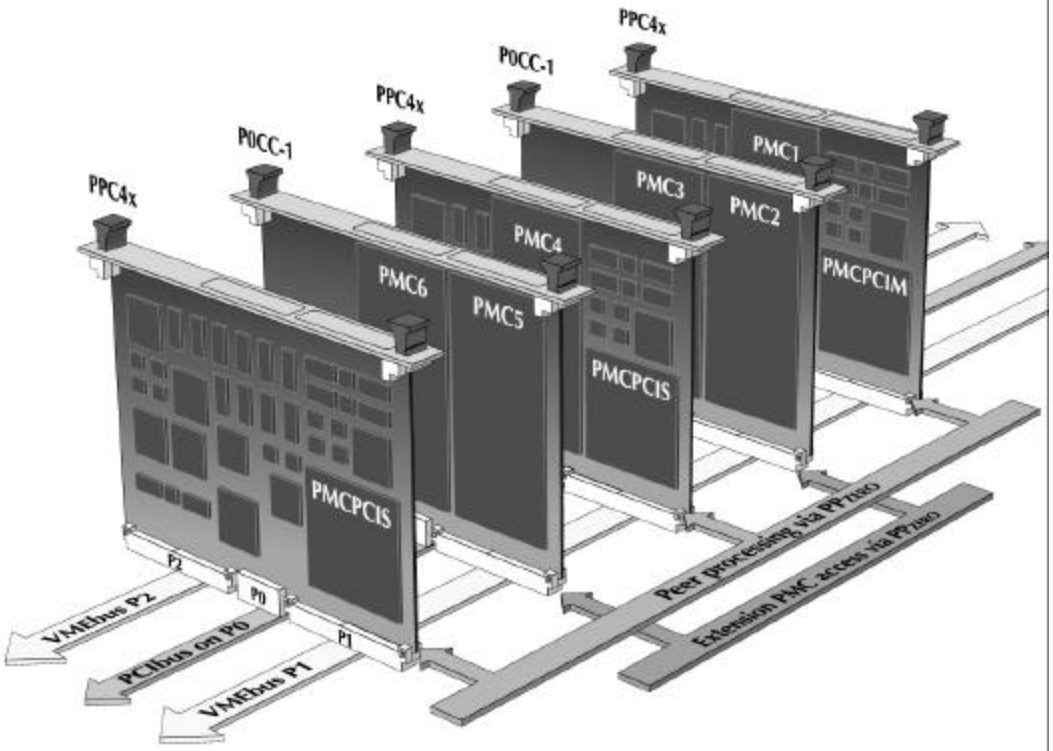
‘Best of both worlds’

Performance

- Provide parallel buses for concurrent data transfer
  - VME - for connection to legacy systems
  - PCI - for high bandwidth inter-board communications
- Radstone’s PPZERO solution

Additional high bandwidth PCI system interconnect from 6U VME card

Bottleneck removal, critical data path optimisation



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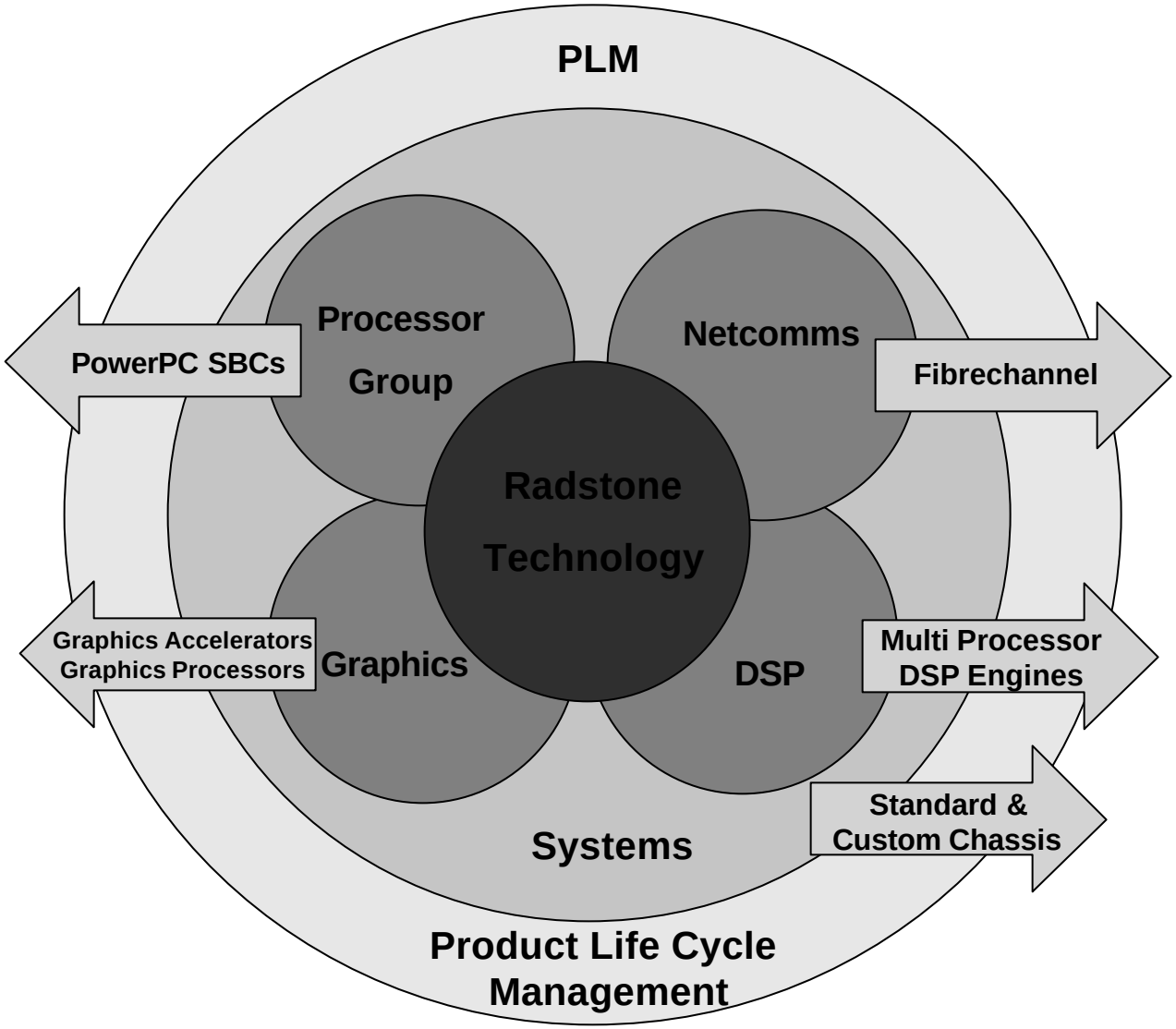
Complete Radstone Single Board Solutions

Performance



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SBC's : PowerXtreme PPC4B

Performance

Latest Processors

High Memory Bandwidth

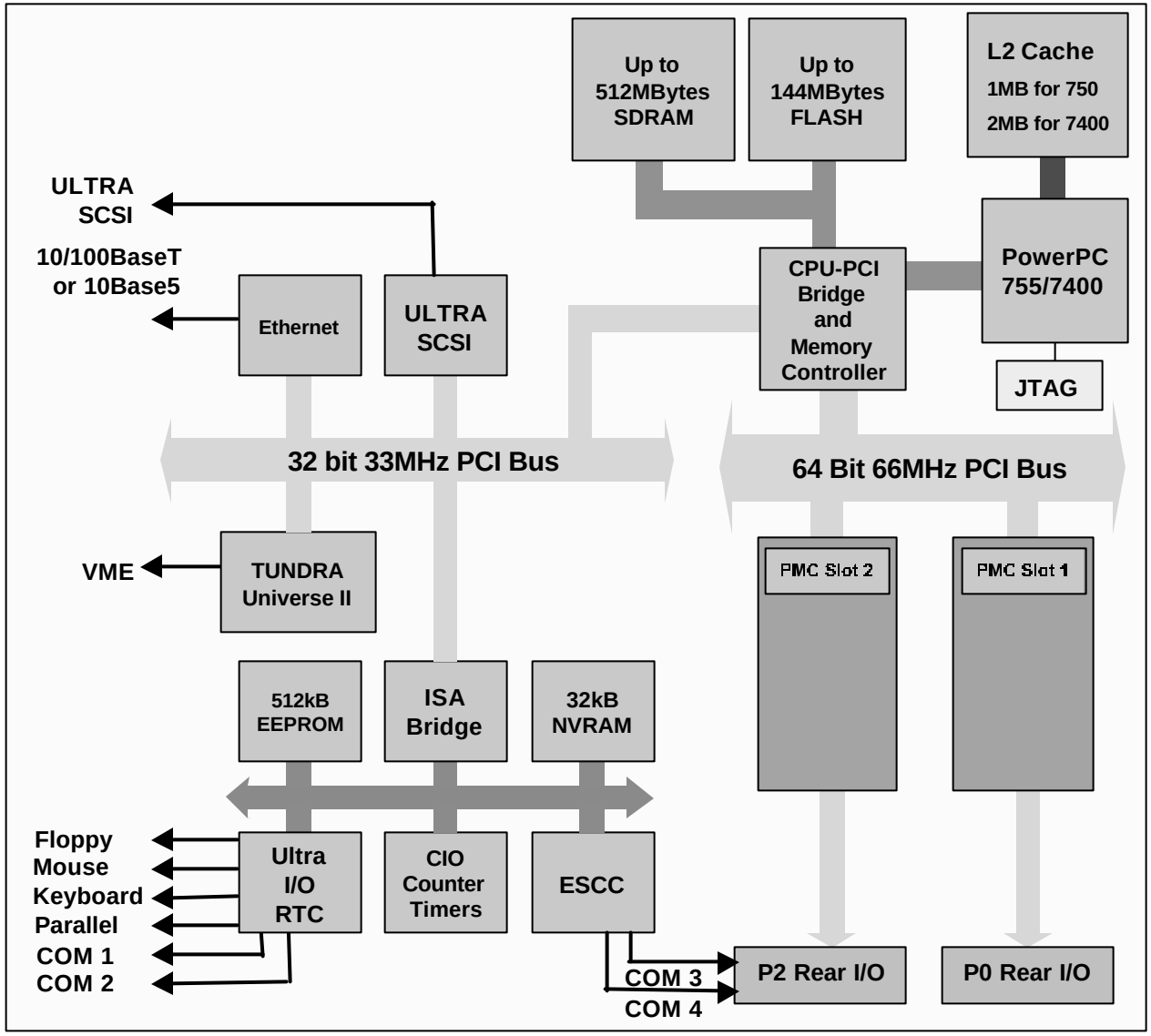
Generous Memory

High PCI Bandwidth

2x PMC extensions

Feature Rich

Fully Rugged



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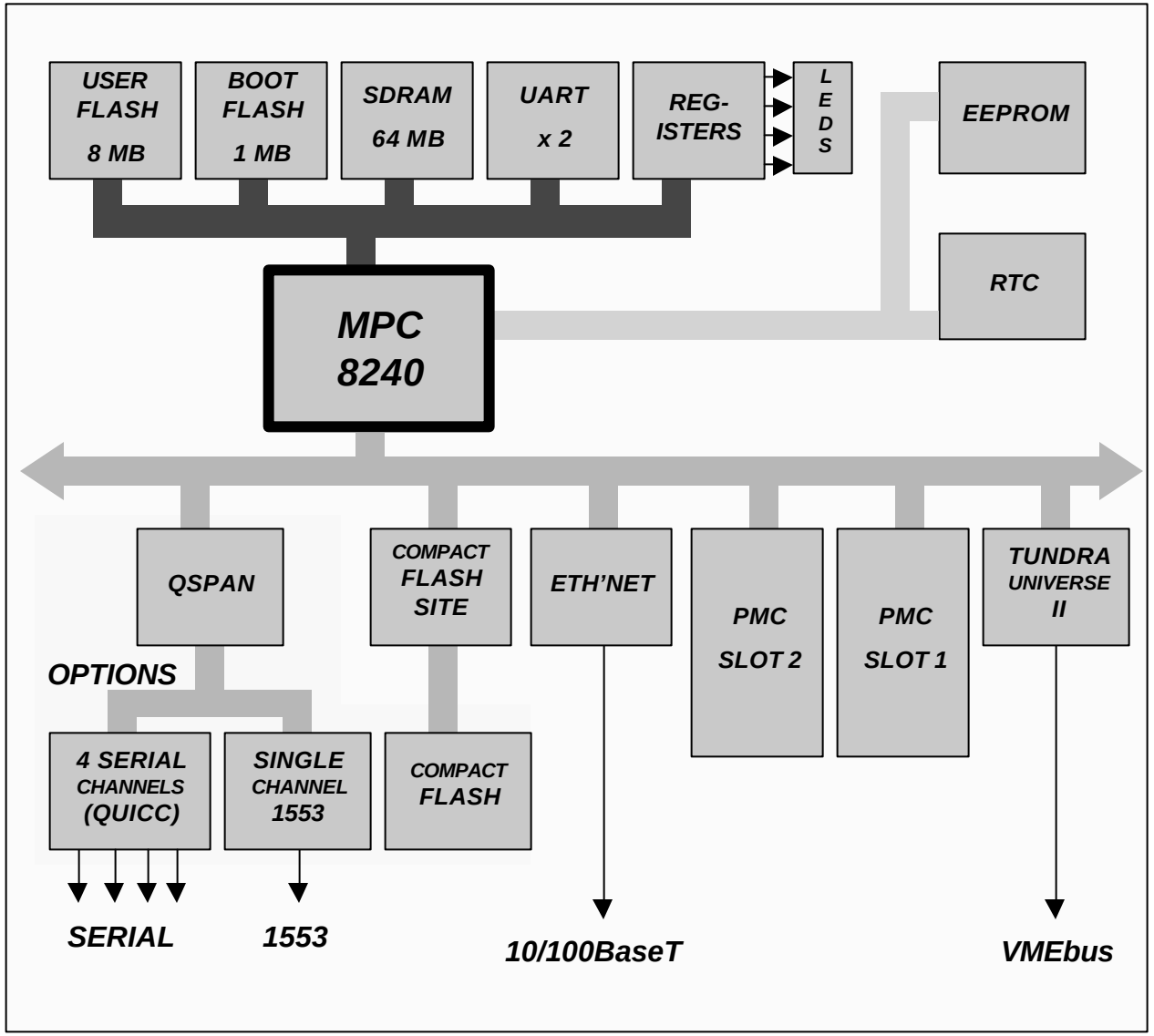
SBC:s : EmPower EP1A

Performance

- Integrated Processors
- Low Power Consumption
- Lower Cost
- Powerful Options
- 1553
- Fast serial
- Compact Flash
- 2x PMC extensions
- Fully Rugged



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Graphics : Octegra

Performance

TI C80 processor at 60MHz

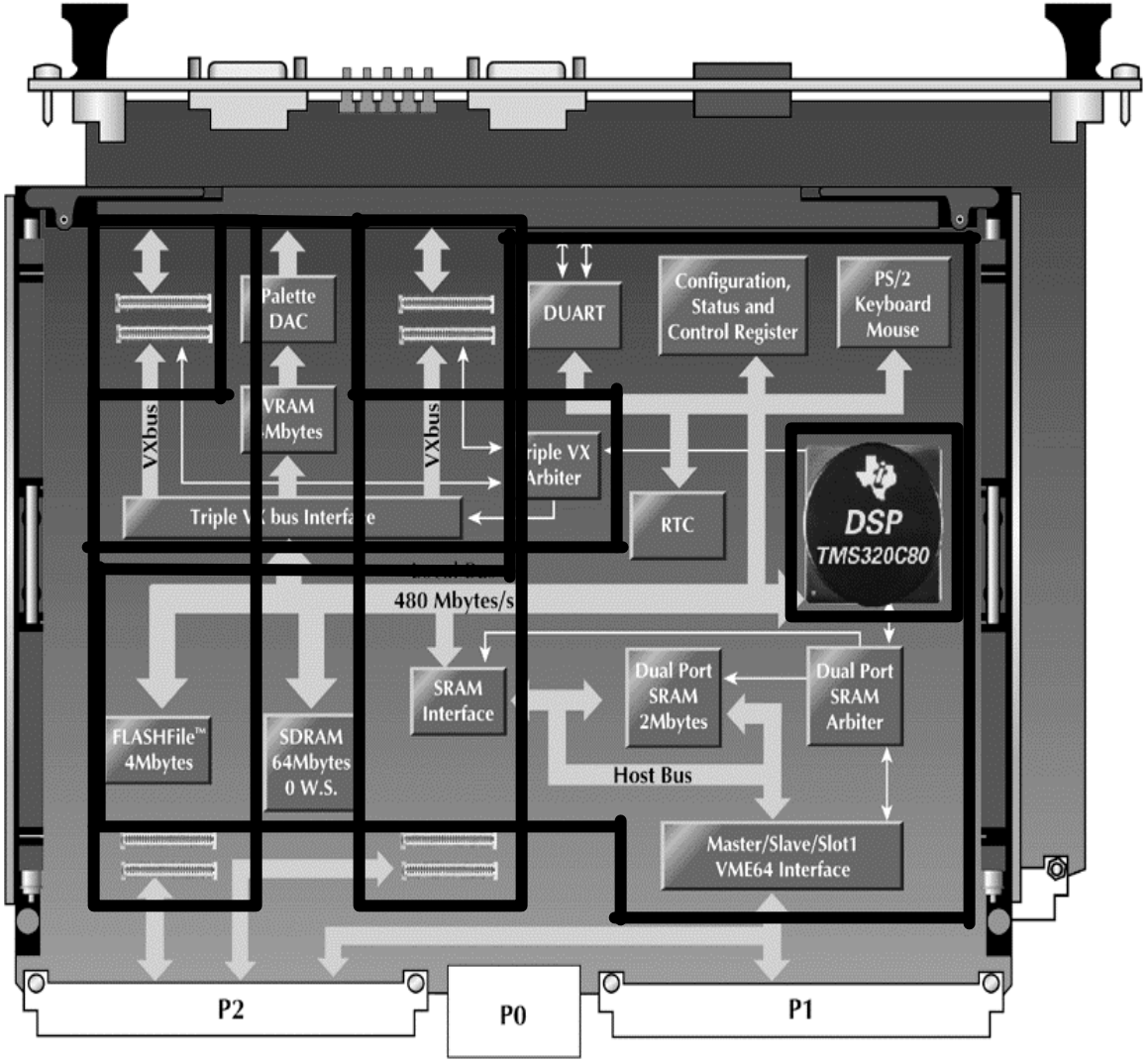
Processor sub-system on 480Mbytes/s local bus

VX bus interface optimized for video and graphics

RS170 or RS343A up to 1600x1280

1 double width or 2 single Vxbus daughter cards for I/O flexibility

Fully Rugged



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DSP : Vantegra 2

Performance

Up to 12 SHARC DSP's (7.2 GFLOPS)

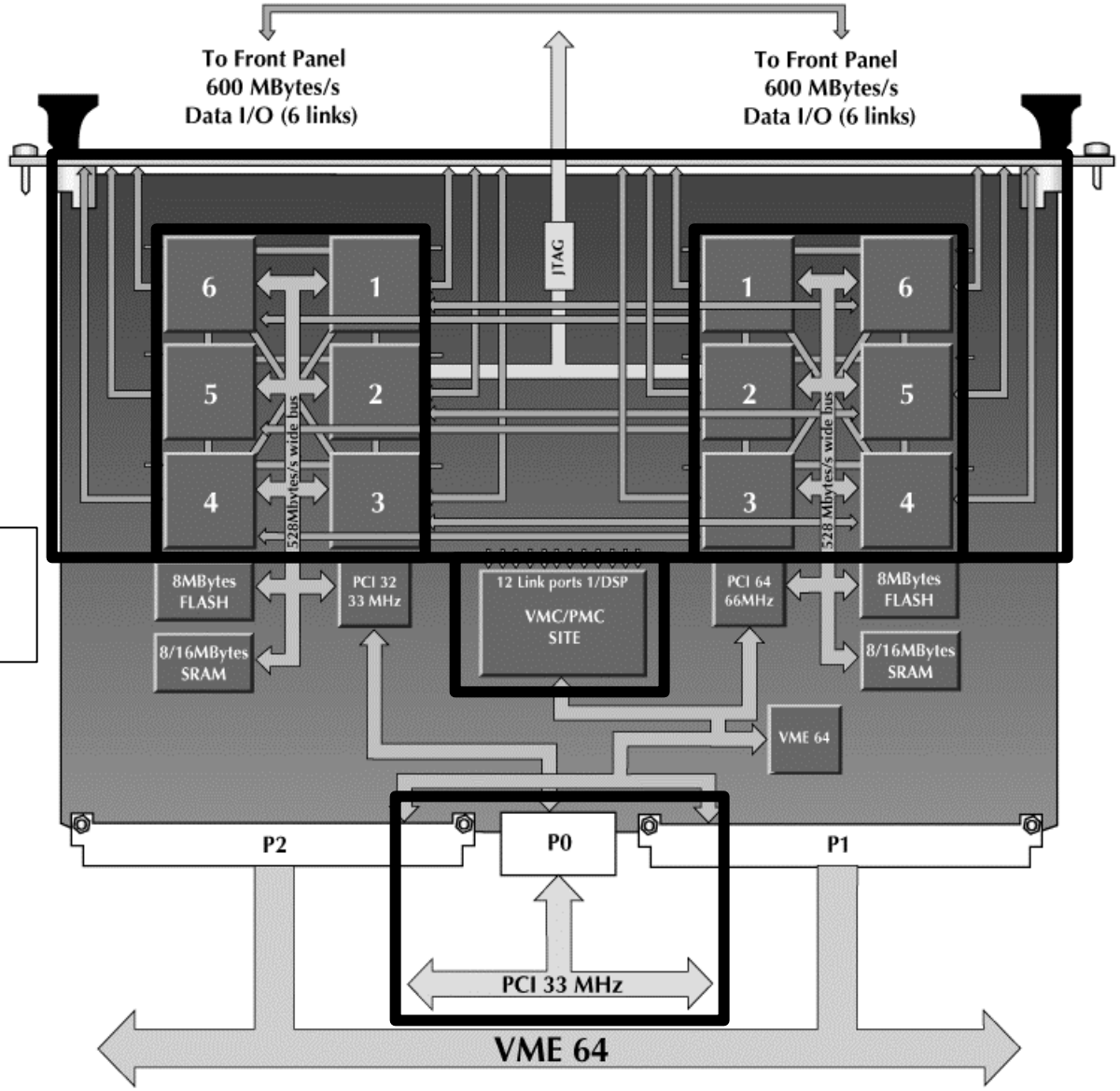
Distributed Link Port Architecture

PMC or VMC Expansion

- 6 port VMC Fibre Channel

P0- PCI 32x33MHz

Fully Rugged



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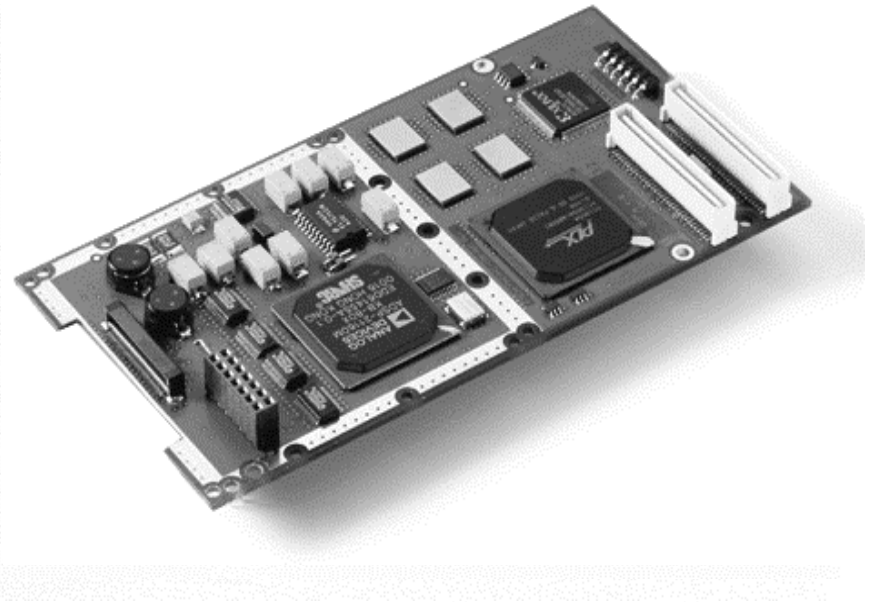
PMC's

Performance

- PMC F2 - Flash
- PMC PCI - PPzero
- PMC Q1 - Sync Serial
- EPMC Q2 - Sync Serial
- PMX 654 - Async Serial
- PMC 1553 - 1553
- PMC FA2 - Fibre
- PMC ATMF - Networking
- PMC CAN - CAN bus
- PMC PIO-1 - I/O
- PMC GA2 - Graphics
- PMC HH1 - DSP Gateway



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Systems

Performance

Custom chassis design

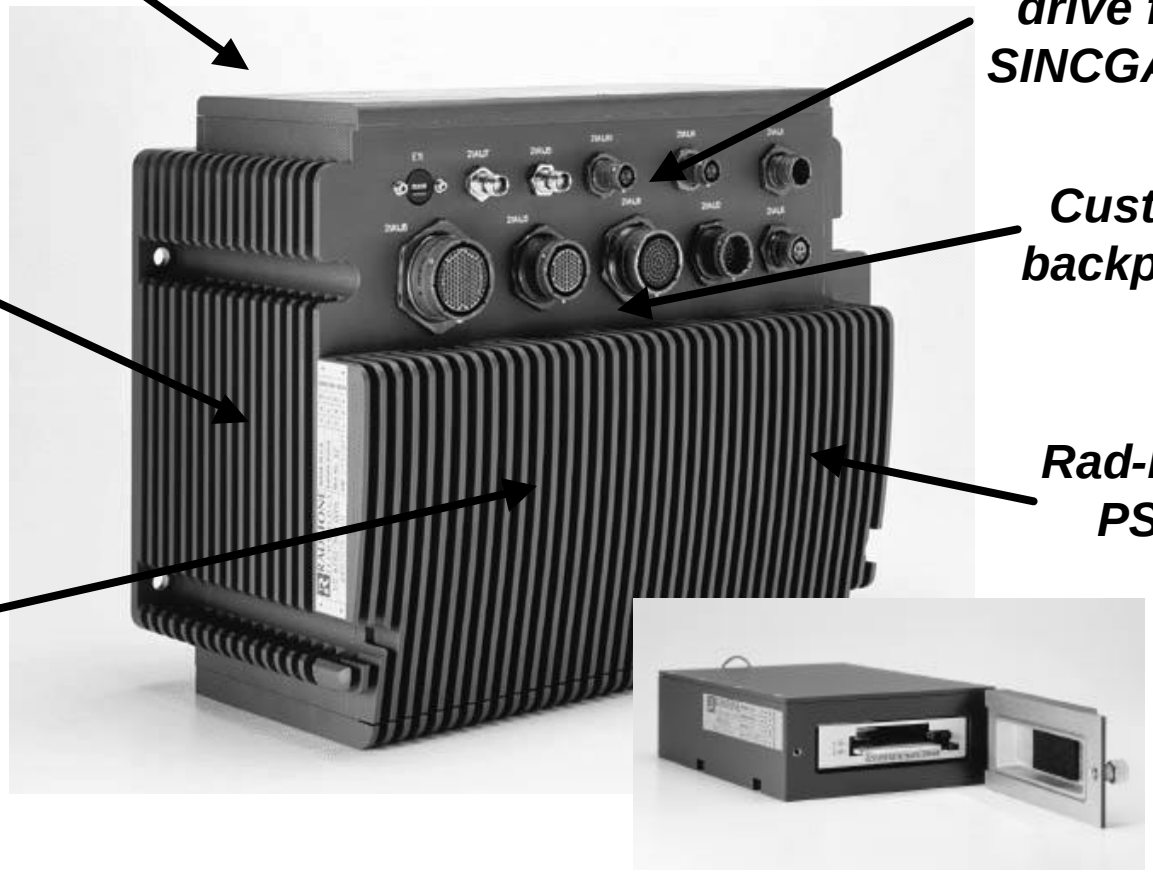
Internal PC card drive for SINCGARS

Custom backplane

FLASH E-Disk Drive

Rad-hard PSU

VxWorks and Linux support



Rugged Memory Card Drive

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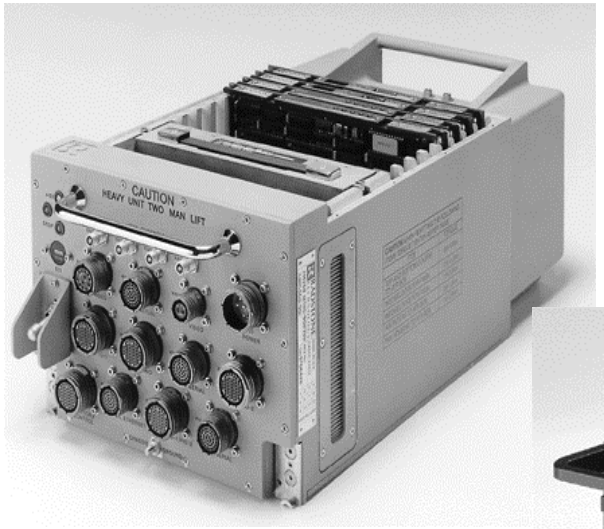
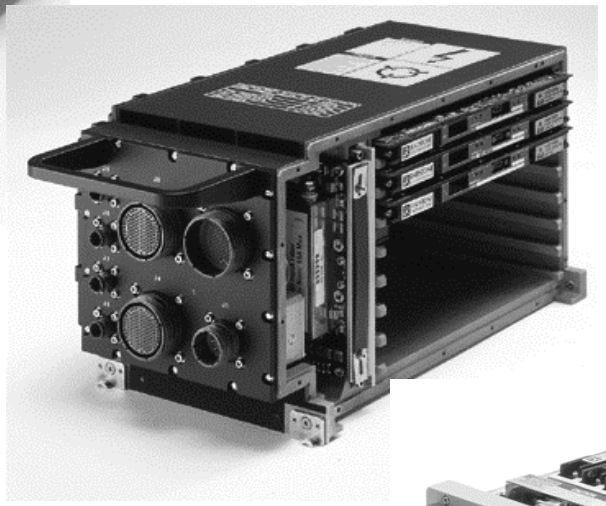
Systems

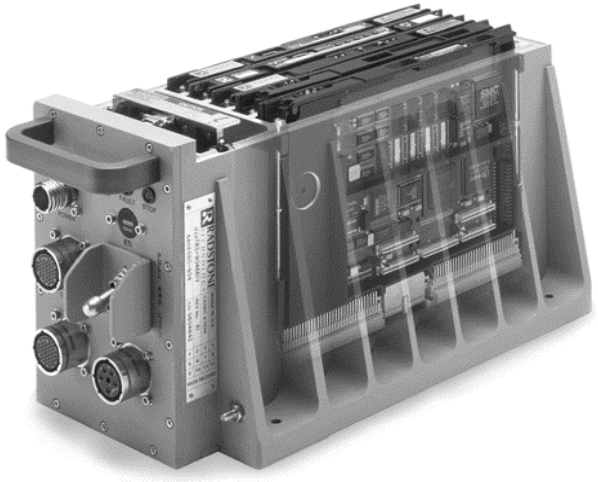
Performance



1ATR Long



3/4 ATR Short



1/2 ATR Short

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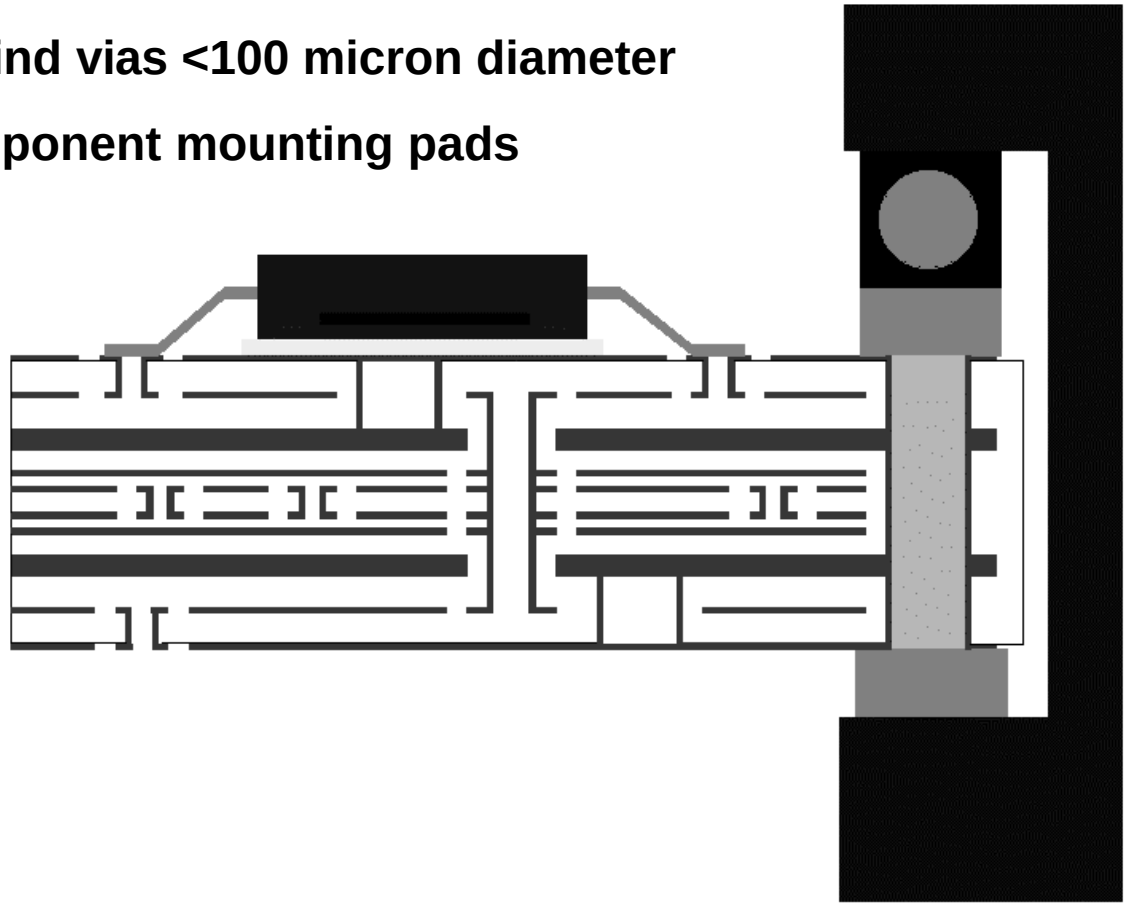
PCB Design

Survivability

Typical Construction

- **RCC-style laminates**
- **Composite thermal layers (Cu-Mo-Cu) etc.**
- **Buried & blind vias <100 micron diameter**
- **Vias in component mounting pads**



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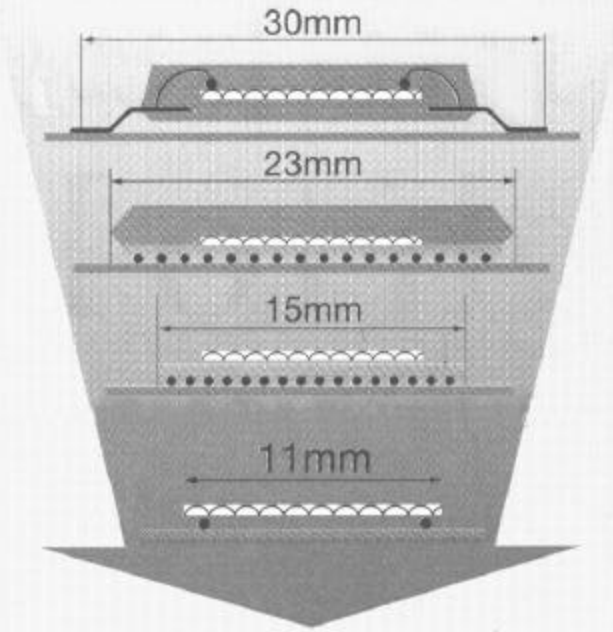
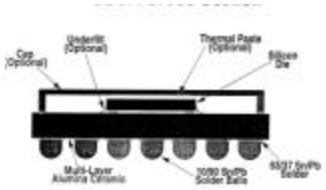
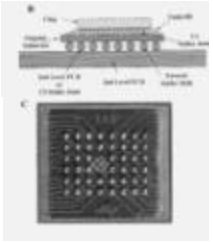
Device Packaging Trends

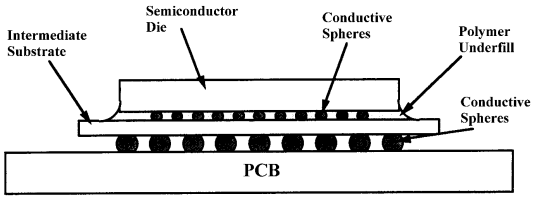
Survivability



Package type	Effective board area	% of area
QFP	900 mm^2	100%
BGA	530 mm^2	59%
CSP	225 mm^2	25%
Flip Chip	121 mm^2	13%







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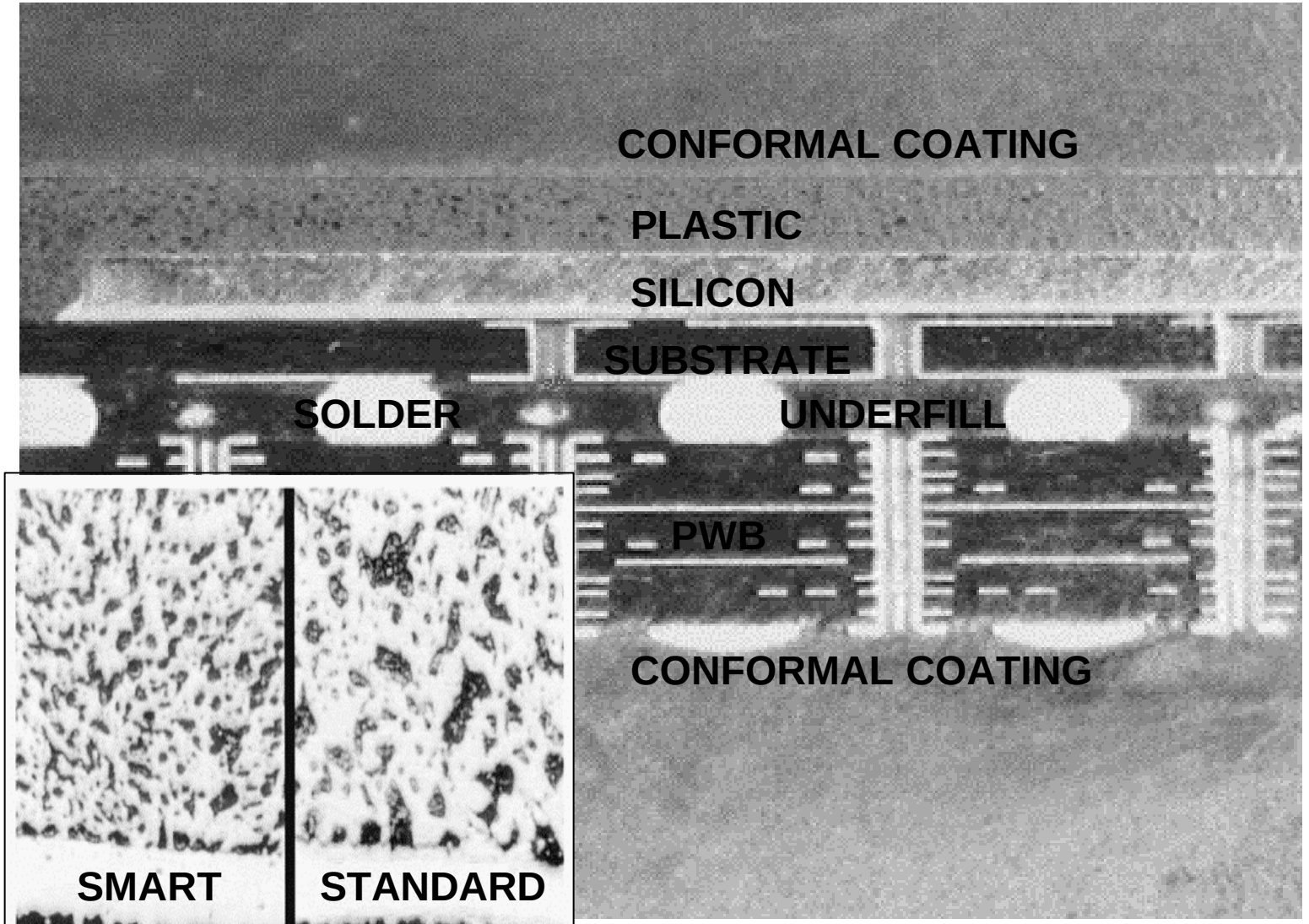
Mechanical Design

Survivability



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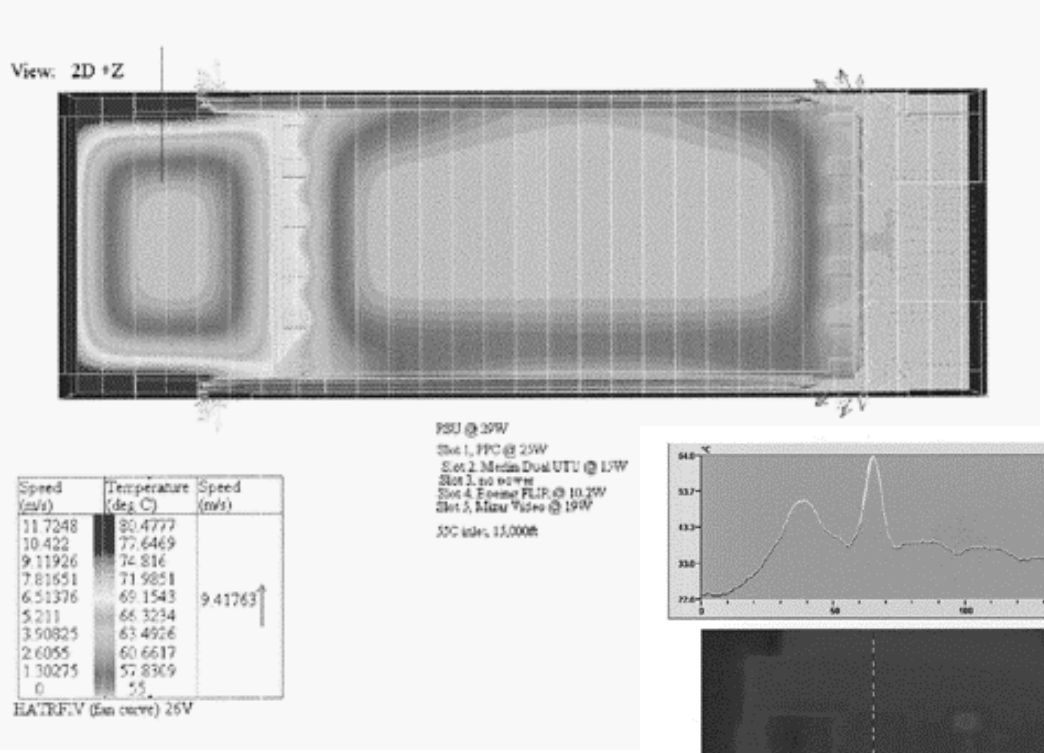
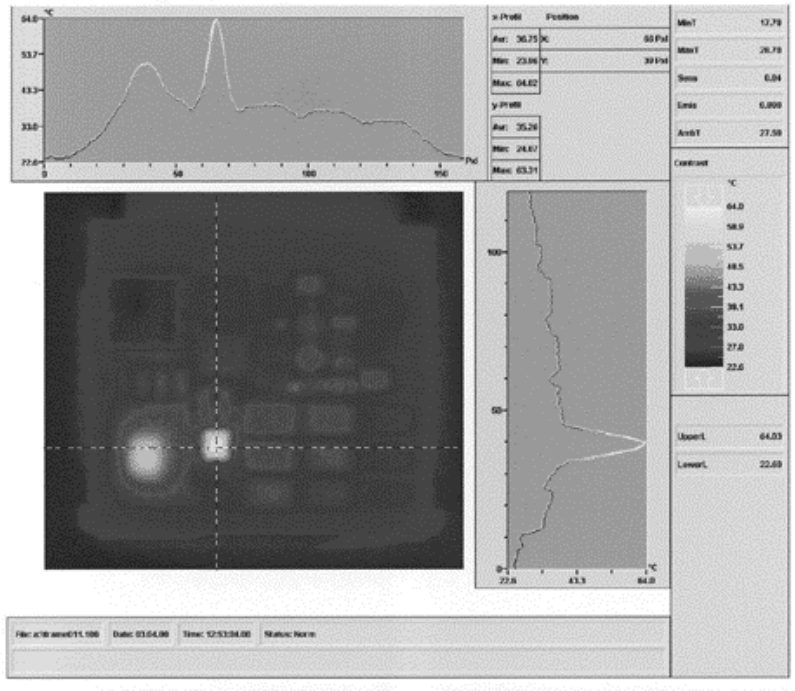
Thermal Design

Survivability



Design : Thermal simulation



Design proving : Infra-red thermography -

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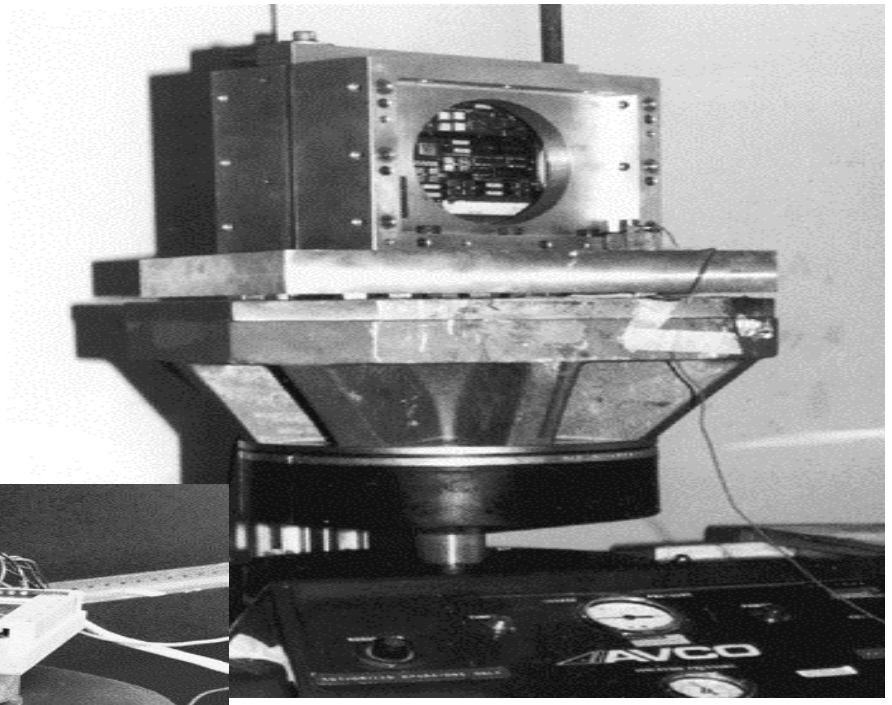
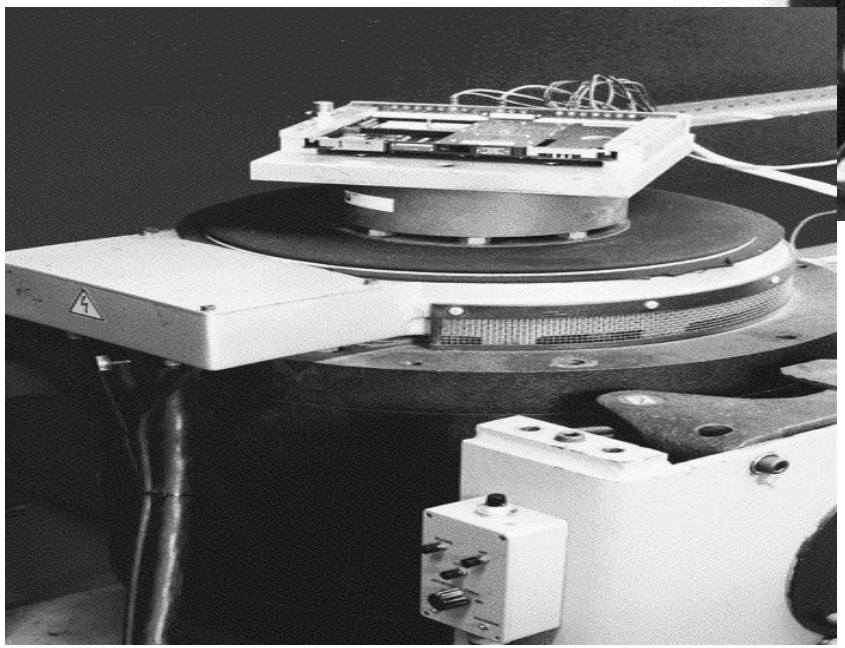
Design Proving

Survivability

Shock test

400g for Air Launched Torpedo





Vibration test

Gunfire vibration in Fast Jet Application

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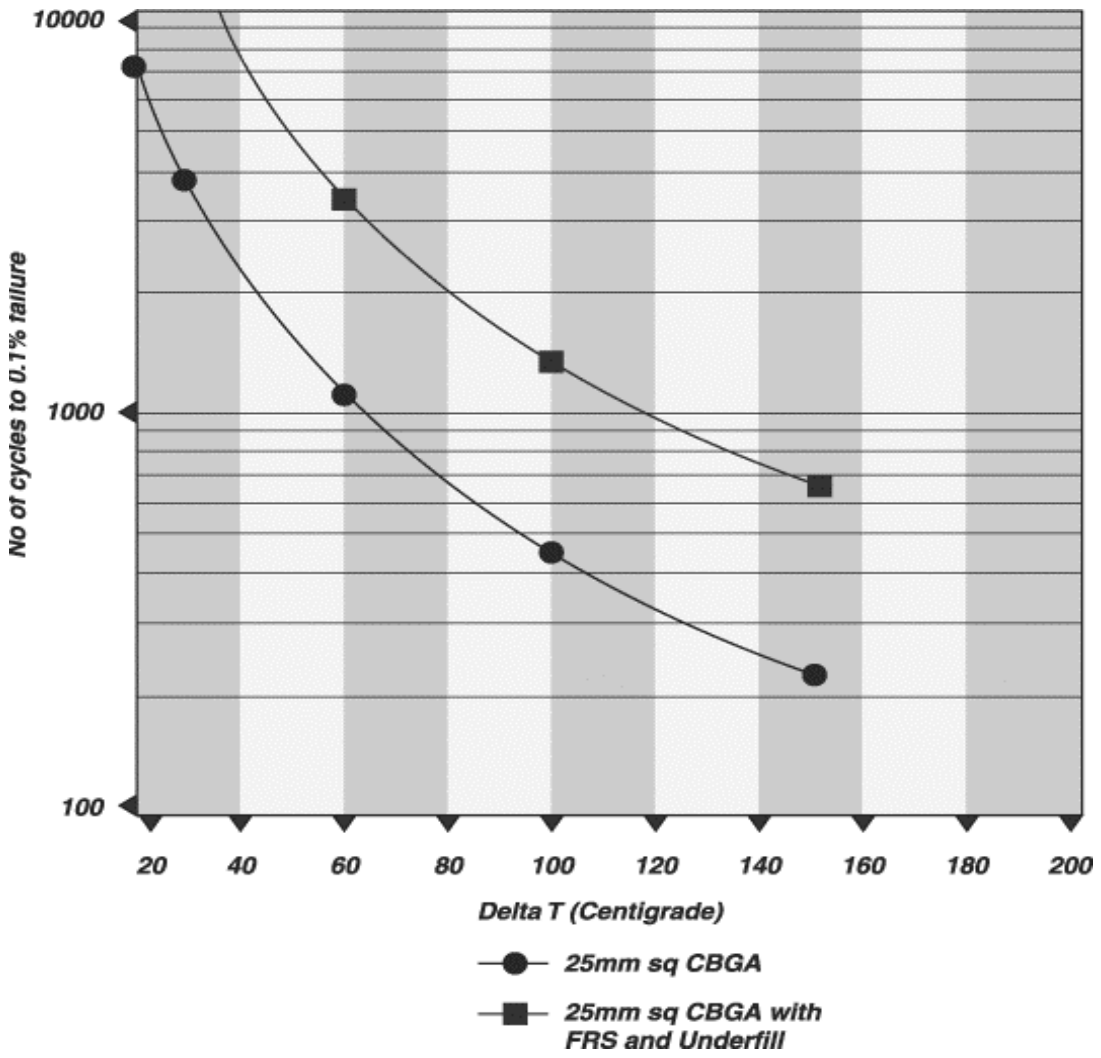
Stress Management

Survivability



- Smart solders
- Underfill
- Overfill
- PCB design

RUGGED

RELIABLE

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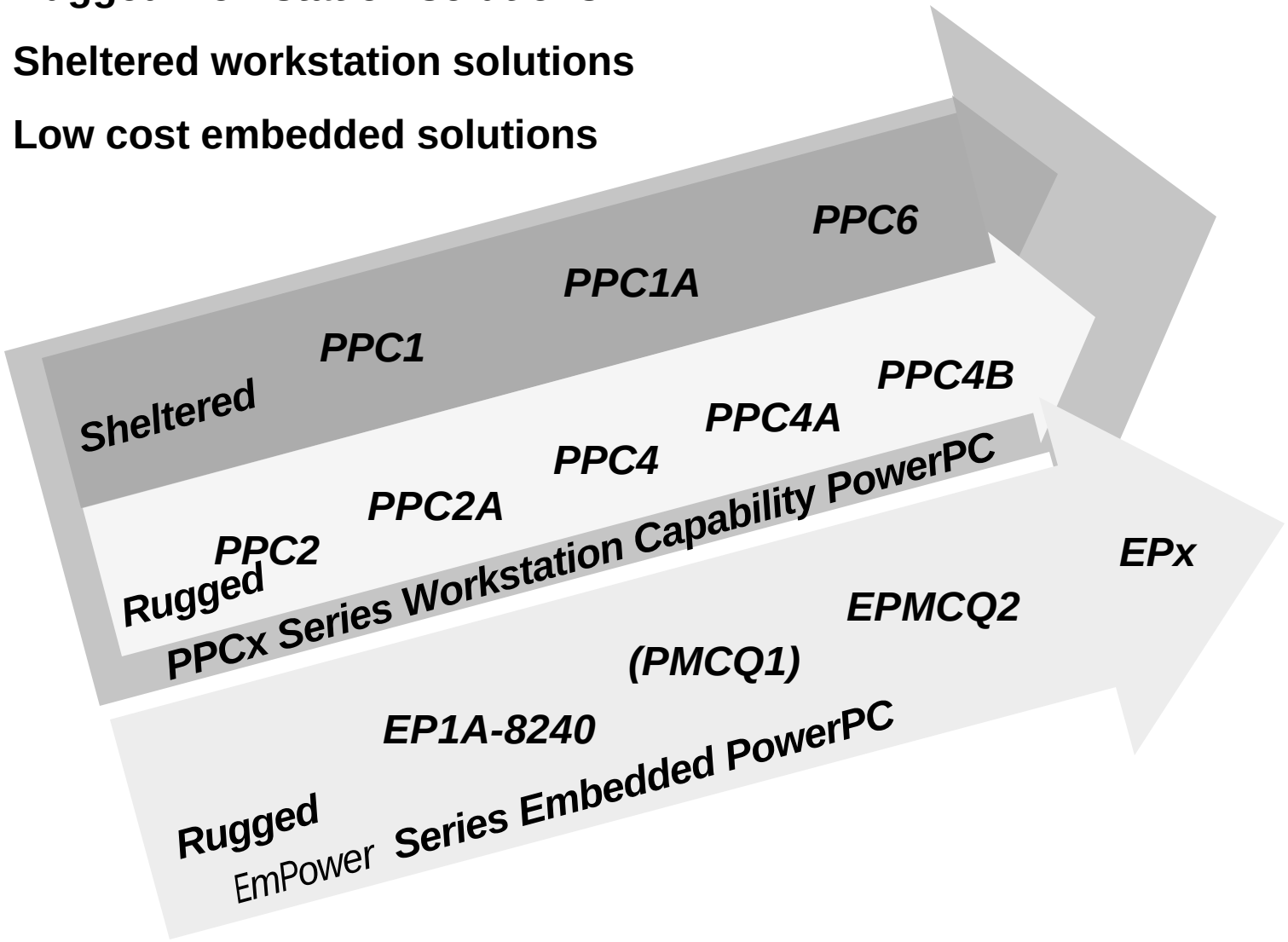
Radstone Solutions : Market Focus

Affordability

Rugged workstation solutions

Sheltered workstation solutions

Low cost embedded solutions



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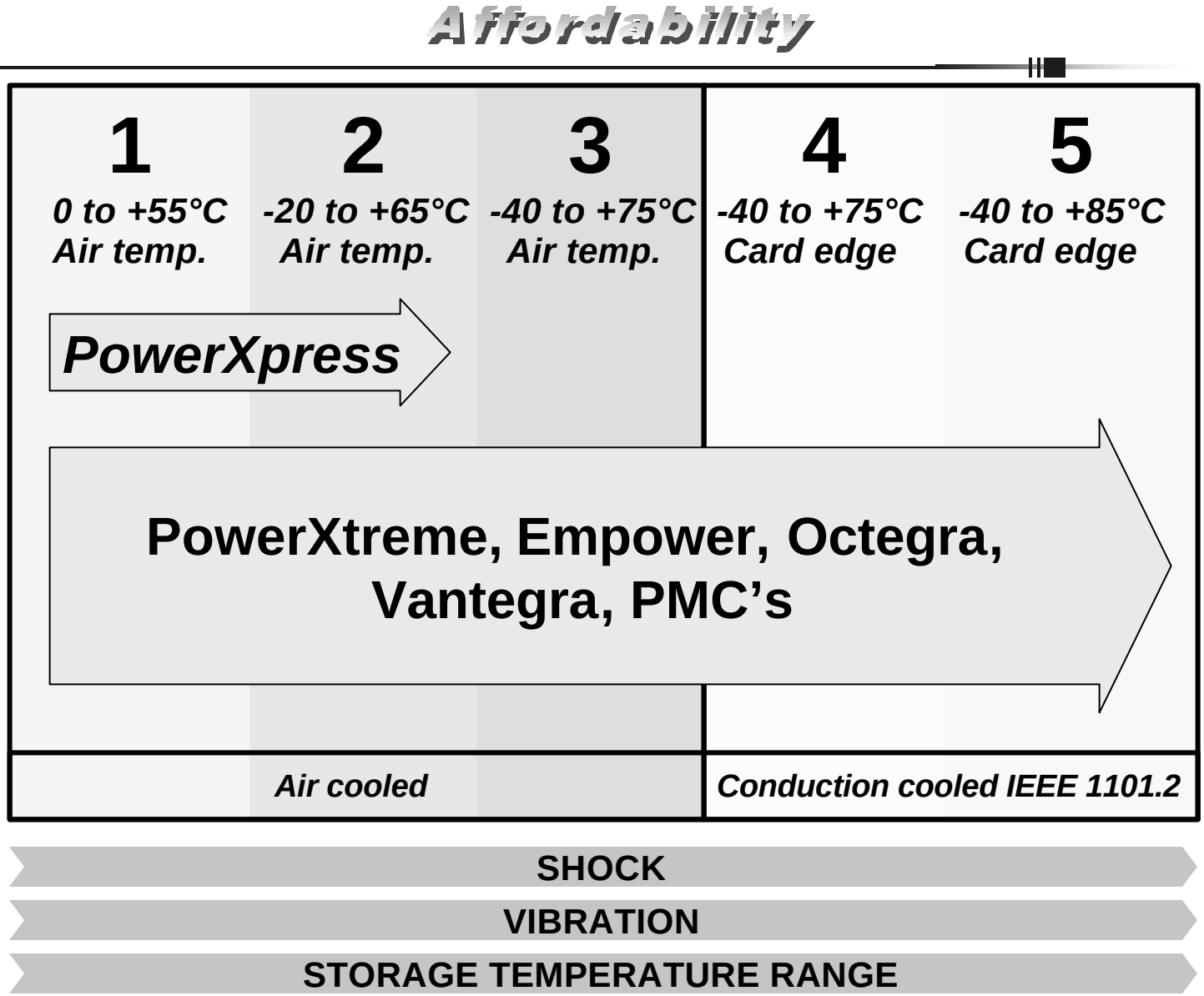
Radstone Solutions : Market Focus



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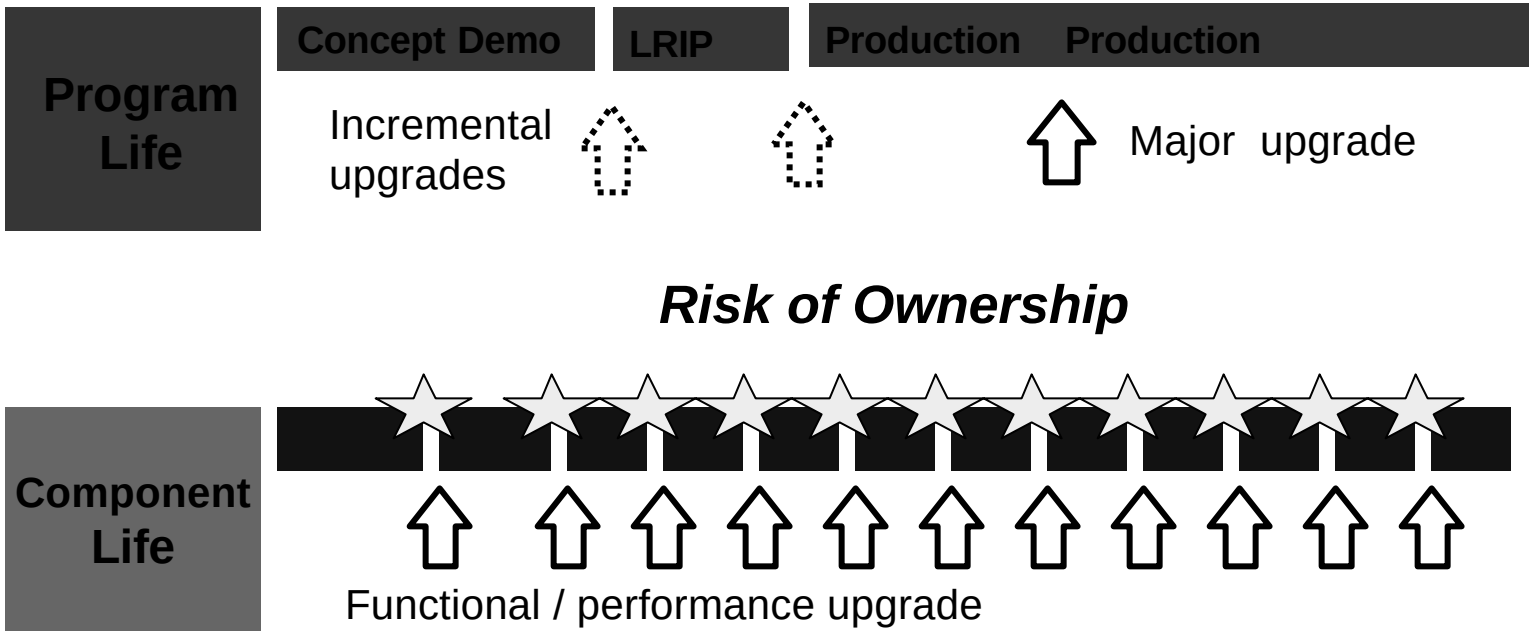
COTS

Affordability

- **Set of modular building blocks**
  - **With transparent technology interfaces**
- **COTS vendors run on the treadmill**
- **Systems Integrators focus on their core business**



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Reducing the Risk of Ownership

Affordability

Repair Services

Technical Support

Long-Term Support

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Whole Program Life COTS™

Affordability

- The aim is to support customers for as long as they need, whichever route they take:
- Configuration Control ensures that a stable hardware platform is maintained throughout each program phase
- Technology Insertion is an option Radstone always endeavors to provide to Customers
- Long Term Support is the option for those customers / programs unable or unwilling to consider Technology Insertion
- Last Time Buy notice *can* be the trigger to initiate discussions with customers over long-term program needs
- All of the above are constituent parts of Radstone's 'Obsolescence Management' philosophy

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